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ABSTRACT

Comments, speeches, and questions delivered at the Quality of Life Symposium are compiled in these proceedings. As an exploratory session, the conference objectives were to (1) become better informed about New Mexico--its resource base, the economy, social and cultural base, and the environment; and (2) to evaluate and discuss the role of New Mexico State University in contributing to the quality of life of its people. Speakers and their topics included: Some Economic Problems of New Mexico by Lee Zink, Director, Bureau of Business Research, University of New Mexico; Socioeconomic Factors and the Quality of Life by Grace Olivarez, Director, Institute for Social Research and Development, University of New Mexico; Natural Resources and the Environment by John Clark, Director, Water Resources Research Institute; and Human Factors and the Quality of Life by N. Scott Momaday, New Mexico State University. Questions and answers posed by speakers follow the presentation of their position papers. Also selected are representative comments from a wide variety of discussion topics--a definition of "quality of life;" jobs with dignity; communication of university efforts; expansion of the extension program; the university's leadership function; and service. (BL)

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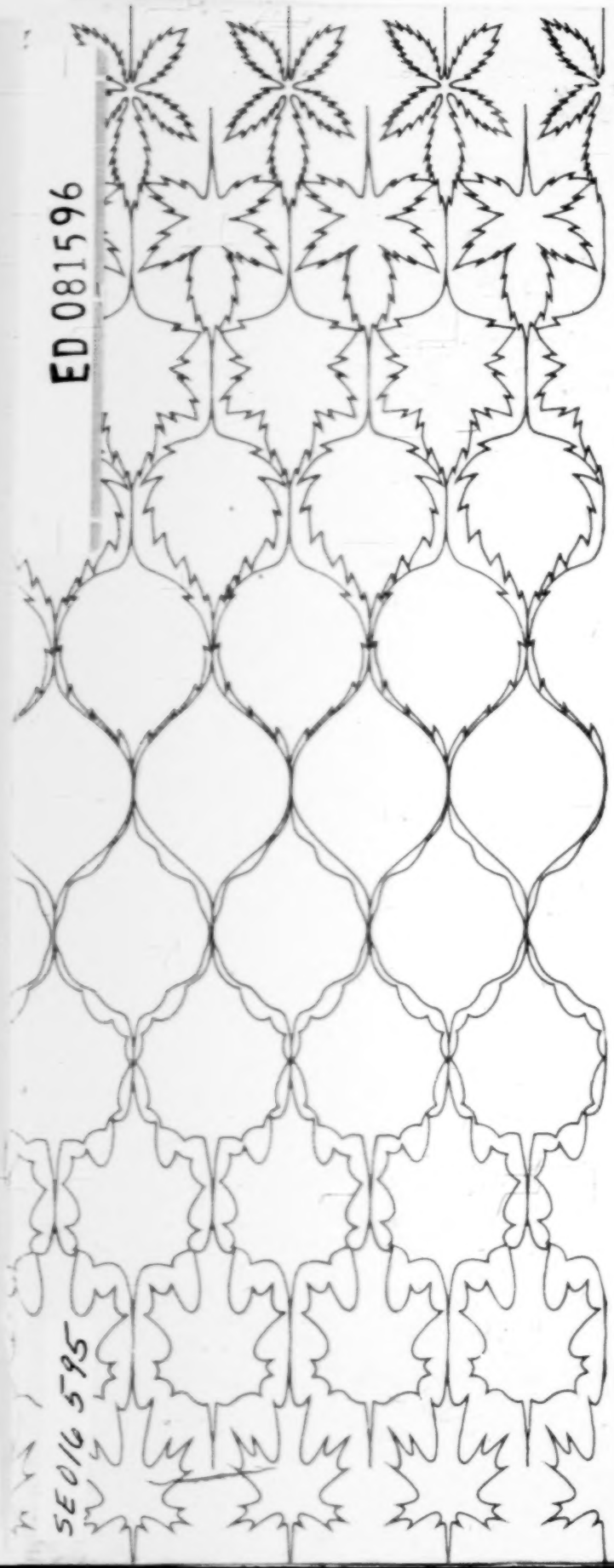

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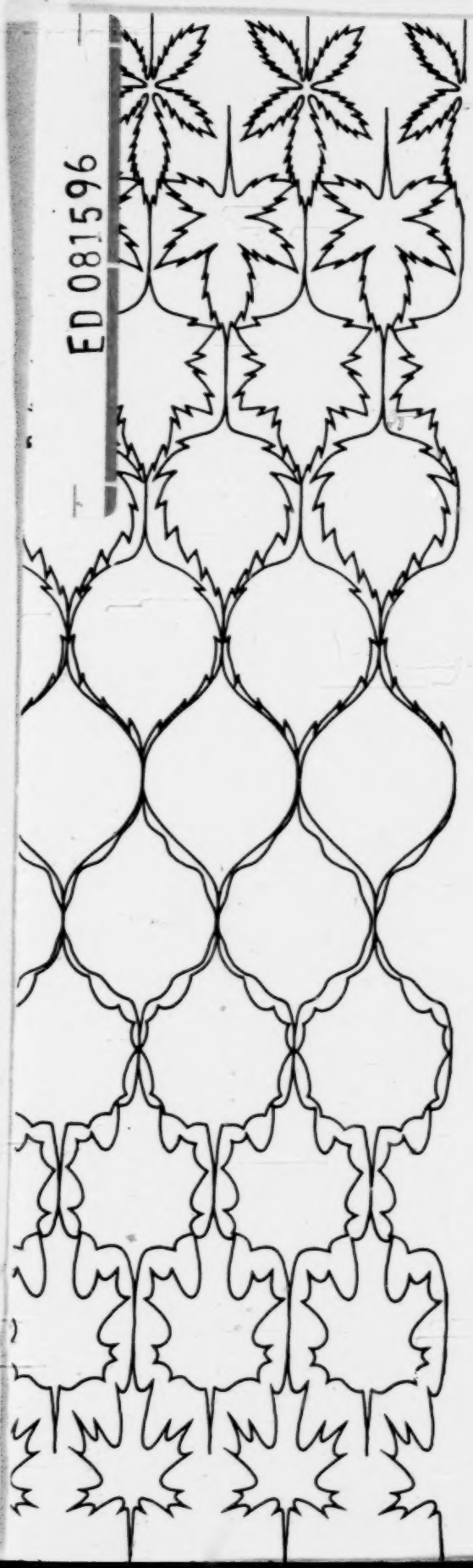

The Quality of Life

A Symposium

presented
for the faculty and staff
New Mexico State University

November 30, 1972

Moderator

Dr. John Hernandez

Acting Co-Director
New Mexico Environmental Institute

Contents

1 **Welcoming Comments**

Dr. Gerald W. Thomas
President
New Mexico State University

3 **Some Economic Problems of New Mexico**

Dr. Lee B. Zink
Director
Bureau of Business Research
University of New Mexico

8 **Socioeconomic Factors and the Quality of Life**

Grace Olivarez
Director
Institute for Social Research and Development
University of New Mexico

13 **Natural Resources and the Environment**

Prof. John W. Clark
Director
Water Resources Research Institute

19 **Human Factors and the Quality of Life**

Dr. N. Scott Momaday
Distinguished Visiting Professor
New Mexico State University

21 **Questions and Answers**

23 **Comments in Discussion**

About the Symposium

New Mexico State University faculty and professional staff participated in the state's first Quality of Life Symposium in November, 1972. The symposium was guided in part by the service mission established by the Higher Education Council on the Quality of Life in New Mexico, an association composed of leaders of institutions of higher education in New Mexico.

The symposium was planned as a forum whereby NMSU faculty could contribute to an assessment of the university's role in formulating goals for economic development in the state and could discuss alternative ways that university resources might further be directed toward improvements in the quality of life of the citizenry.

These proceedings will be sent to the NMSU faculty senate for policy considerations. In this way, any official statement regarding the university's role in economic development or quality of life programs will emanate from the properly designated body.

Other colleges and universities in New Mexico will also receive copies of this document to aid in planning similar symposiums.

Quality of Life Symposium Committee Members

Dr. Donald B. Croft, director, Dove Learning Center
Jen H. Dennard, newswriter for Information Services
Dr. John W. Hernandez, professor of civil engineering
Dr. Jerry G. Hunt, associate professor of business administration
Dr. N. Scott Urquhart, associate professor of experimental statistics
Dr. James A. Zwerneman, associate director of Center for Business Services and acting head of the economics department

Welcoming Remarks

Dr. Gerald W. Thomas
President
New Mexico State University

This is a very special program—an exploratory session, perhaps better described as a brainstorming effort. It came about as a result of a challenge from Governor Bruce King when he formally designated the presidents of all of the colleges and universities, both public and private, to form a Quality of Life Committee and to follow up with a series of quality of life programs.

The program today also partially resulted from challenges presented by members of the legislature when some of us attempted to support our budget requests. The legislature keeps challenging us to become better informed ourselves and to re-examine our role in improving New Mexico.

That's enough history; suffice it to say that we are accepting this challenge. This brainstorming session is the evidence. I'm not going to define quality of life for you. For the purposes of this conference let us assume that the definition is broad. The list of speakers and the program will verify this.

As I see it, there are two rather specific objectives for this conference. First, hopefully, we will all be better informed about our state—the resource base, the economy, the social and cultural base, and the environment. Second, we want to evaluate and discuss our role as a university in contributing to the quality of life for our people. Also we need to evaluate the role of all universities and colleges—all of higher education, both public and private—as we relate to this state in which we live and work. We want to explore the possibilities for more effective research, more effective teaching, more effective continuing education, more effective service to the state.

We've already begun some programs as a result of the efforts initiated by Governor King. Only recently the presidents of all of the universities met with all of the state agencies as a part of this overall effort. We hope the people and the legislature will realize the broad scope of activities in which we already contribute to the quality of life for our people. And, we need to explore the ways and means to be more effective in these efforts.

If this program is successful, similar symposia will be planned for other institutions—drawing on the first experiment of NMSU. If this program is successful, the state will gain from this experience. If this program is successful, we will all have gained because we (and our families) are all involved in matters relating to the quality of life for all peoples in New Mexico. We are concerned and interested in maintaining New Mexico as the land of enchantment. Thank you for your cooperation, your interest, your input, and your contributions in time and effort.

"Higher education cannot lead the way nor should it . . . Our role is to support . . . when appropriate and to withhold our support when appropriate."

area has a sound base upon which to build and, in cooperation with the scientific community of the state, should be able to develop a significant new source of employment.

In summary, the outlook for future growth of the New Mexico economy is not entirely clear at this time. It does appear that there are only two sectors which offer significant potential: manufacturing and services. There are problems in both of these areas, but they are problems which can be solved.

The picture I have painted is not an encouraging one. I have not mentioned all the problems relating to the state's economy. Important areas omitted relate to land ownership, land-use controls, special problems of minority groups, and unique cultural attitudes, among others. Some of you could undoubtedly name others which would be cause for equal concern.

An important, but unanswered, question is "What do New Mexico citizens desire?" How do they feel collectively about growth versus no growth? Do they understand the implications of any position they take? Do we understand the implications of our positions?

Let us assume that we have answered the questions above and that a majority of New Mexicans agree that we should take positive action to assure that the state's economic problems are solved. What do we do?

No one has perfect answers. We can look to some "experts" to help us find these answers. Certainly a number of those experts are here in this room and may already have some of the required answers. May I emphasize again that the assumption that expertise to help solve these problems currently exists among the various faculties in the state was a founding idea for the council. Higher education cannot lead the way nor should it. That role belongs to others who are in the development business. Our role is to support them when appropriate and to withhold our support when appropriate. In both instances we must have sound reasons for our particular stands: reasons based on objective analysis, not emotion.

The actions that will solve these problems for New Mexico will require a fresh attitude toward change, significant intellectual endeavors, and enlightened political leadership. Higher education certainly has a role to play in all three areas. I close by challenging you to join with all New Mexico citizens in seeking these solutions.

Socioeconomic Factors and the Quality of Life

Grace Olivarez
Director
Institute for Social Research and Development
University of New Mexico

There's a big difference between a standard of living and a quality of life. I've told a lot of the people that I work with they already have a quality of life. The quality of life is what a lot of Midwesterners and Easterners are coming to New Mexico to get when they build a house in Pojoaque or when they go out to Chimayo. Our people have the quality of life that a lot of escapists are looking for. What our people are looking for is a standard of living. Those who are looking for quality of life already have the standard of living, and we're going to have a terrific clash as we proceed with this interest in quality of life vs. standard of living.

Let me give you an example that hits very close to home. A couple of friends of mine who went to school in the Midwest are very proud of the fact that they helped defeat a bond issue in Santa Fe which resulted in closing down the airport. They were interested in quality of life, but the people who work at the airport were interested in standard of living. One group got quality; the other one didn't get standard. I think this is a serious issue that we have to deal with.

There are many ways of measuring the life of people and a nation. The United States has been blessed with an abundance of natural beauty and resources, a rich diversity of human talents, and the oldest continuing form of government on earth. But we can no longer afford to live only on past memories. Many American dreams are not being fulfilled; others are being fulfilled at a disastrously high cost.

There is now one powerful item on this country's agenda, so powerful and pervasive that it affects every aspect of individual and community life. That item is the issue of population. But not everyone is ready to discuss this issue. A lot of people are ready to cuss it. A traditional ethic of growth, encompassing economic development, technological expansion, and the spread of affluence, fueled itself on the axiom that the more the better. The more growth the better, the more people the better. Bitter experiences forced a closer examination of that axiom--the experiences of polluted air and water, of slums and decaying urban centers, of senseless violence, of jammed freeways, of alienated youth, of spoiled wildernesses, of neglected and thus embittered minorities.

It would be a mistake to attribute all of these problems to growth, size, or distribution of population. Nevertheless, many of us are convinced that population is a potent intensifier and multiplier of many of these ills. Not one of them will be made easier, much less cured, by a larger population. Even the present size of the American population and the way we are distributed poses immense social, political, and cultural difficulties.[1] They will not be easily overcome. A fresh burst of rapid population growth would gravely jeopardize the chance of coping with them. Moreover, at the present and highly hazardous rate at which the United States consumes world natural resources, the implications for the future of global resources and environment would be

[1] From a paper by Daniel Callahan; prepared for the Commission on Population Growth and the American Future, 1971.

". . . population plays an intricate role among the many pressures under which our deprived groups have lived."

enormous. This, then is a capsulized version of the population issue in the United States.

I admit that the fertility rate has been dropping consistently and is probably at the lowest point it has ever been. But let me remind you that many members of the World War II baby boom are now in childbearing age and even at the minimum rate of one and two children will continue to account for growth in the United States for another 70 years. We can't anticipate any kind of stabilization in that period.

Any effort to grasp the dynamics of our population on a national or local level must include a serious effort to understand what is happening among the socially and economically disadvantaged racial and ethnic minorities who are struggling to break out of the backwaters of our society. I have met, as a result of my service on the population commission, with social scientists, government officials, and spokesmen for these communities. At best, I can say that population plays an intricate role among the many pressures under which our deprived groups have lived. However, this much I can say for certain. This nation in general, and New Mexico in particular, cannot hope to successfully address the question of future population without also addressing the network of unemployment which results in poor housing, poor health services, and poor education, all of which combine to act upon and react to pressures of population.

Unemployment is heavily tied up with education and mobility. The state of New Mexico has the unfortunate distinction of being almost at the bottom of the scale in almost all of the socioeconomic indicators, e.g. extremely high illiteracy rate (in spite of the fact that we also have a high median in education), higher than national average unemployment rate, a disturbing exodus of young talent because of lack of employment opportunities in the state. I would like to trace with you very briefly the costs and benefits arising from geographic mobility, which is one of the main problems facing New Mexico right now in terms of unemployment. I must admit right away that this definition is complicated by conceptual limitations.

One problem is that mobility is not uniformly advantageous to the migrant. Many factors contribute to the degree of advantage that the migrant may realize. Generally, an individual who is more educated and skilled stands to gain more by moving since he or she is able to compete more effectively in new labor markets. (Let me specify that I'm not talking about the agricultural migrant exclusively.) Public investment in the migrant as a human resource--for example, through manpower training, job counseling, and relocation assistance--can contribute positively to the outcome of moving. However, in the last year we've noticed a constant drying up of funds from Washington for these particular types of programs. Also, paths of occupational mobility that moving opens up for migrants may depend on the prevailing economic climate and its effect on the demand for labor. Unlike stock dividends paid out with predictable regularity, the dividends of making a move are largely contingent on a mixture of individual characteristics, public measures, and sheer timing.

A second analytical problem is found in the lack of symmetry between advantages and disadvantages. "Whereas the gains of mobility are found to be primarily economic; namely improved employment and income, the costs are essentially noneconomic."[2] The economic benefits of moving must be set against the stresses induced by loss of friends, relatives, and familiar surroundings; and in the culture of Mexican-Americans, the Chicanos, the American Indian, and to many extents, the American Black, these are the types of prices that they're not willing to pay. We discovered when we were trying to recruit Chicanos from the South-

[2] Gerald C. Somers' introduction to "The Returns of Geographic Mobility: A Symposium," The Journal of Human Resources, Vol. II (Fall, 1967), 428.

"From a locality's perspective, geographic mobility can be viewed as a process that imports and exports various 'goods' and 'bads'."

west to midwestern and eastern institutions of higher education sometimes the offer of a Harvard scholarship or a Yale scholarship or a Columbia or Princeton or University of Chicago or Michigan scholarship is not at all interesting to these minorities because of the cost of being away from the family, from friends, from relatives, from the culture, from the music, and the food. It's just not worth going to the East and coming back with a supposedly better degree. The social and psychological dimensions of these stresses are variegated but poorly understood. Migration resembles resocialization in the depth of its personal impact, and it has mixed effects on social organization by, for example, increasing the capability to adapt to change, while undermining informal controls over behavior.

Third, the spatial dimension of mobility introduces an added complication in the comparison of benefits and cost. One locality's gain may be another's loss; or an individual's gain may be a locality's loss. Indeed a generic paradox of the migration process is that while the participants may benefit individually, their movement can lower the aggregate "quality" of population--measured in terms of specific characteristics like average education or income--at both origin and destination. Everett S. Lee, whose work I used to prepare this paper, points out that "the education of migrants from rural areas (and let's face it, New Mexico has an abundance of rural areas) while greater than that of nonmigrants at origin, is less than that of the population at destination."[3] From a locality's perspective, geographic mobility can be viewed as a process that imports and exports various "goods" and "bads." Thus, California may be enjoying the services of bilingual teachers trained at New Mexico's expense. Cities may "import" low-income and minority group populations from rural areas (thereby inheriting fiscal responsibility for solving national problems of poverty, dependency, and discrimination) while "exporting" taxpaying elements of their population to the surrounding suburbs.

Rural poverty confronts policymakers with a "people problem" and a "place problem." The "people problem" centers on those left behind by prolonged outmigration. This is what we see happening so much in the rural areas up in the northern part of the state--residual population that possesses few of the attributes and skills needed to compete successfully in a metropolitan labor market. Typically, such a population experiences high levels of poverty, unemployment, and dependency, but its potential for further outmigration is diminished even more by previous losses of population. The "place problem" the policymakers face is that some localities simply are no longer economically competitive and prove to be progressively less viable within the context of a national metropolitan economy.

The thrust of public policy in the past has centered on revitalizing places, infusing them with development funds on the assumption that reviving an area will increase and sustain the welfare of people living there. The strong sentiments supporting this approach--which often border on nostalgia--fail to come to grips with the facts of economic obsolescence. The record of past experience shows that massive capital investment in depressed rural areas cannot, in general, alter this obsolescence. Self-sustaining growth fails to materialize for many reasons. I realize that these statements may alienate a lot of you because they're still a push for bringing more money into these rural areas, but we fail to take into consideration some of the other variables; money alone is not going to do it. The other thing that we're witnessing in New Mexico, particularly in Albuquerque because it happens to be the largest metropolitan area, is the cost to the community of the rapid influx of new population.

Rapid influx of population as in Los Angeles and San Jose, for example, generates two objectionable features. First is a constant strain on available infrastructure and pressure to provide additional

[3] Everett S. Lee, "A Theory of Migration," Demography, Vol. III (1966), 57.

"The public costs of a national transition to a metropolitan economy devolve upon those who remain behind in obsolete localities."

capacity. Since the inmigration stream contains disproportionate numbers of children, the demand for education rises rapidly. Air and surface transportation capacity becomes saturated and expansion requires major capital investment; demand for energy and water resources and the need for waste disposal capacity rises. In a sense, we've been experiencing that in Albuquerque. In general, rapid increase in these factors causes the long-term objective of planning to give way to the short-term objective of providing immediate capacity. This is what I hope that the rest of New Mexico doesn't get caught up in. I've been going around peddling planning which doesn't seem to get much reception. The outcome tends to be wasteful and disorderly expansion and the closing off of subsequent options.

Second, rapid influx contributes to a developmental process which often creates long-term public costs that are not effectively internalized. Then we have the problem of the chronic decline.

The public effects of migratory decline and growth are visible in three areas of current policy concern. One centers on rural and chronically depressed areas--settings of population decline and economic stagnation that remain substantially unaltered despite a decade of public intervention. Second is the trend toward abandonment of central city poverty areas by those who are financially able to find another place to live. Third is the highly uneven pattern of urban expansion being created by the natural dynamics of the migration system and the prospect that future increase will gravitate toward a relatively small number of rapidly growing urban centers.

While promoting personal wellbeing and a collective redistribution of people that is broadly beneficial, outmigration's selective character focuses the attendant costs of adjustment on the area of origin. Prolonged outmigration, as we have been experiencing in some of the smaller villages and towns of New Mexico, gradually siphons off more valuable elements of the labor force--the young, the well-educated, the skilled, and the healthy. Its continuation over time leaves behind a labor force whose characteristics further reduce the locality's already marginal competitive position. In short, the cumulative effect of prolonged de-population tends, beyond a certain point, to be self-reinforcing. The public costs of a national transition to a metropolitan economy devolve upon those who remain behind in obsolete localities. De-population benefits those who depart while contributing to the obsolescence of the areas that they leave.

I would like now to address myself to what does this do in terms of our governmental structure. Our political institutions were designed originally to govern a much smaller society, organized and oriented differently from what we have today. But in a sense I think that what other states can anticipate because of growth centers and loss of population in smaller communities, New Mexico has already had as part of its history. What has happened is that these institutions have changed as society has changed. And by these institutions I mean our political institutions. They have demonstrated remarkable flexibility and adaptability, but they have also shown some serious inadequacies. Now the real question is: Are these political institutions still capable of accommodating more population growth in the future?

The answer to this question depends in part in maintaining and improving citizen participation and representation. Of course, I use the term citizen to mean all citizens regardless of income, education, age (of course 18 years and over), and color, race, national origin, and sex. Political activity and interest among urban people is as high as, if not higher than, that of rural people, according to a public opinion survey that was conducted by the population commission. Still, the development of metropolitan political forms to deal with population change must include efforts to increase citizen representation and participation and the responsiveness of a larger bureaucracy. This, in a sense, is what Common Cause is trying to accomplish.

Representation at the national level is diluted by population growth. The constituency of an indi-

"I see very little possibilities of any exciting things for the good of all people happening in New Mexico."

vidual congressman has grown enormously since the size of the House of Representatives was fixed at 435 members in 1910. Then, each congressman represented 211,000 citizens, on the average. In 1970, a congressional constituency averaged 470,000 citizens. By the year 2000, each congressman in a 435 seat house will represent 623,000 persons under the two-child growth rate or 741,000 persons under the three-child growth rate.

The size of the constituency is clearly not the sole factor determining excellence in government or the ability of minority groups to participate. Perhaps, the size may not even be very important compared with the quality of the representatives, the size and professionalism of their staffs, the size of the governing body itself, and other factors. But, it cannot be denied that the individual constituent's voice will be diminished under such circumstances. And, no increase of Congress's ability to communicate with constituents by mass media can disguise or make up for that diminution.

Population growth at the national level is just one demographic element to be considered in the adaptation of a political system to the needs of the twenty-first century. Population redistribution, as well as population growth, will affect the congressional profile. Representation will follow the people to metropolitan areas, away from the rural areas to growing states like California and other coastal regions—away from the midcontinent. For example, if California continued to grow as it has in the past, its share of the seats in the House of Representatives would increase from 10 percent of the total to 14 percent by the year 2000. Thus, California would have over 1/5 of the 270 electoral votes required to elect the President.

While the strains on the political system related to large constituencies may be alleviated somewhat by population stabilization, increased metropolitan concentration, which we have been experiencing and will undoubtedly continue to experience, and interregional migration will continue to alter the makeup of the Congress and shift its orientation. In our studies with the population commission, we became very concerned about the uncertainties implied by these findings and strongly recommended that they be given further attention.

Let me conclude by saying that being a new New Mexican I must be very open and honest with you, even at the risk of hurting some of you. I see very little possibilities of any exciting things for the good of all people happening in New Mexico. I find too many people too busy building power bases and to hell with people. I find too many people with very small egos or perhaps very big ones that need to be fed. I find people being threatened by everybody around them, and I find the political system here a little bit devastating and nauseating. I find too many people dependent on an elected official for a clerical job that pays $200 a month. To me that's totally in violation of the 13th Amendment, that's involuntary servitude. We didn't like it then and we shouldn't like it now. I am only looking to people like you for help and for any promise of any benefits coming to New Mexico. We have too much to worry about here for us to engage in vanity, in ego, and in power-building.

Natural Resources and the Environment

Prof. John W. Clark
Director
Water Resources Research Institute

Improving the quality of life has become an increasingly urgent national, and to some extent, an international goal for all levels of government and is commanding the attention of many areas of the private sector. We have just completed a national election for which much of the debate centered on this issue.

Decision makers are establishing policy and programs and allocating unprecedented resources to enhance the quality of life. What is the quality of life? How is it measured? What is the rate of change and in what direction? Unfortunately these questions cannot be specifically answered.

Ideally, we would like to set forth a conceptual approach to measuring the quality of life. A scale or tape measure marked off in QOL units with, say, zero at one end and one hundred at the other—from hell to heaven. Each individual, each segment of population (city, county, state, or region) or the total population could be equated to some number of units in between. Such a system would have much utility in the setting of national goals, program evaluations—sort of a benefit-cost ratio for priority ranking and policy decision-making.

The state of the art in measuring the quality of life as a whole has not gotten off the ground. It is largely undefined and is used as a slogan, i.e., a call to think bigger. There is nothing particularly objectionable in the sloganistic use, but we must recognize that we don't really know what we are talking about when we use the phrase. Certainly money is not a total measure of the quality of life. Why have income and dissatisfaction increased at the same time? The major difficulty is that the quality of life is in the mind of the individual. It is a very personal thing, and it is always in transition.

Man has always been concerned with this concept called the quality of life, and this concern is shown in his loftiest achievements as artist, scholar, mystic, or activist.

Some eight thousand years ago man made a discovery which eventually transformed the whole of human life. For perhaps a million years prior to this time, man had wandered individually or in small bands in search of whatever food nature might provide. The discovery that food could be produced, either by cultivating plants or by taming animals, changed man's entire way of life. With an assured control of his food supply, he built the great civilizations of antiquity. Development in a purely agrarian society was slow and its benefits were thinly distributed. The lot of a large segment of society in ancient civilizations was hard, a condition due chiefly to the fact that all work was performed by muscle power. Even so, this development (the fact that he could now produce more than he could eat) provided time for a few. Living in one place with other men and with a greater emphasis on real property provided man time to think of himself and the meaning of life. What he began to dream of and what he has been dreaming of ever since was how to make his life better and how to live longer; how to have higher standards of living, better health, social equality; and especially how to reduce the need for human muscle power. These developments gave him time to plan and to hope and to question—what is man?

In the second or first century B.C., man made his second revolutionary discovery by finding that much of the muscle power could be replaced by natural forces. The first machine to use these natural forces was water power.

Around the tenth century of the Christian Era,

". . . energy richness coupled with liveability insures our opportunity for success in the future."

people began to use water power for other than agricultural purposes. They invented water-driven machines which could hammer metals, saw wood and run oil presses. As the supply of usable energy increased, there was rapid development of an industrial base.

Near the end of the eighteenth century, other great steps forward took place. Man invented a number of intricate water-powered machines which could carry on such delicate processes as spinning and weaving. At about the same time, men harnessed fossil fuel (coal) to heat water to steam and then forced the steam under pressure to drive pistons of work engines.

In the nineteenth century, oil and natural gas were added to the list of energy-producing fuels, and internal combustion engines were designed to use gasoline from the oil. By the end of the nineteenth century, man had developed electrical energy, transmitted it great distances, and then converted the electrical power to mechanical energy to do work.

Finally, in the twentieth century, man found a new and tremendous power source, nuclear energy. Fissionable minerals were added to man's supply of energy-producing fuels and gave him a vast new reservoir of potential energy. As a result of fresh scientific knowledge with its technological consequences and their utilization by industry, man strode from discovery to discovery, from invention to invention, at a consistent and ever-quickening pace. That development has brought us to the situation as it exists today. There is no turning back. Progress under the influence of industrialization has produced a demand for material goods and services that continues to grow.

Here is where New Mexico's great chance comes in. New Mexico is an energy rich state. We have an above average amount of oil, coal, natural gas, and uranium. We have the potential for geo-thermal energy and the potential for solar energy.

This energy richness coupled with liveability insures our opportunity for success in the future.

Future potential is usually determined by the basic factors of demand and/or need. Demand is the less reliable guide because it is subject to change, due both to technological advances and to the instability of social trends. A need is a more dependable guide. It is born of a requirement and thrives when the requirement determines the general welfare. There is no question in my mind but that the greatest technological need of the immediate future and beyond for the United States and the world is energy.

Energy means food, climate control, light, transportation, metals, water, oxygen, fiber, and many other things.

I don't mean to imply that all we have to do in New Mexico is to sit back and wait and money will eventually be dumped at our door. Just the opposite of that: we must work at researching and planning in order to make wise decisions affecting New Mexico's natural resources.

In the United States, with a growing population and, more significantly, an even greater increase in per capita energy consumption, electrical energy demands will continue to grow at an unprecedented rate. Lees and others have pointed out "...even assuming near zero population growth, a drop to one-half the present rate of growth in individual wealth, and a corresponding 50 percent reduction in the current rate of increase in power use in the next decade, U.S. consumption of electricity will still triple by 1990."[1]

One of the major problems in developing our energy base is that most of these systems require large amounts of water. For example, a 1,000 megawatt light water nuclear reactor requires 1,900 cubic feet per second or 1,375,000 acre-feet per year water

[1] Lester Lees, et al., People, Power, Pollution, Environmental and Public Interests Aspects of Electric Power Plant Siting (Pasadena, Calif.: EQL Laboratory, California Institute of Technology, 1971), 5.

"As a state, we need to place considerably more emphasis on water quality."

withdrawal for a 15° temperature rise in the water. The evaporation rate would be increased because of increased temperature so the net effect would be an increase of about 13,000 acre-feet per year of consumptive use. On the other hand, the same power plant could be operated with cooling towers with about 26,000 acre-feet per year consumptive use or an increase of 13,000 over the once through process. In order to gather a better feel for the amounts of water involved, consider that Elephant Butte Dam passes about 790,000 acre-feet of water per year when there is plenty of water in the reservoir. So the total flow of the Rio Grande below Elephant Butte Dam would not be enough water spread over the whole year to cool a nuclear power plant with a flow through system, and of course, the 15°F temperature rise would not be acceptable because of the aquatic life. With the use of cooling towers, it would take the flow of about 10 large irrigation wells in the Mesilla Valley running continuously.

New technological developments, especially in power generation, may solve the waste heat problem in the long term. Unfortunately, these can be expected to have little effect on plant systems put into operation through the year 1990 because of the time lags between proven research and commercial availability. A consulting panel for the National Water Commission recently estimated that two-thirds of the nation's generating capacity in the year 2000 will be comprised of systems presently in widespread use.

New Mexico will have to use systems that utilize cooling tower techniques to dissipate waste heat because we do not have the large quantities of water necessary for flow through cooling. The use of this type of system increases the consumptive use of water and also increases the potential for pollution of surface and groundwater supplies. As a state, we need to place considerably more emphasis on water quality. In water development, we tend to make too many decisions on the basis of short-term effects without giving adequate attention to their long-range social and environmental consequences. I would like to illustrate this point by examining a recent major decision involving the Upper Rio Grande.

The Rio Grande is generally considered to have three regimens as far as water use is considered in the United States: these are the river from its head in Colorado to Fort Quitman, Texas; the Pecos River; and the main stem from Fort Quitman to the Gulf. The reach of the river above Fort Quitman is known as the Upper Rio Grande. Nearly all of the water produced in the Upper Rio Grande is consumed in that sub-basin.

The Upper Rio Grande system carries a large salt burden (dissolved solids) contributed by a variety of natural and man-made sources. Depletion of stream flow by consumptive use of water for irrigation, municipal, and industrial use and by natural evapotranspiration reduces the volume of water available for dilution of this salt burden. As a result, salinity concentrations in portions of the system exceed critical levels for certain water uses. Increased efficiency in water management for agriculture and continued economic development in the basin will increase stream flow depletions and add salt which, in turn, will result in higher salinity concentrations.

As salinity concentrations increase, additional adverse physical effects are produced on some water uses. Unless adequate research information is obtained to support appropriate salinity management programs in the basin, future increases in salinity concentrations will seriously affect water use patterns and will result in large economic losses to water users and to the regional economy.

Because the Rio Grande Basin is primarily an arid region, those few perennial streams within the basin have considerably more influence upon the lives and livelihood of the region's inhabitants than any other element of the physical environment. Any alteration, modification, or subtle change of this resource must, therefore, be carefully evaluated. The Upper Rio Grande has its headwaters in southcentral Colorado and flows south through the length of New Mexico and turns southeast at El Paso, Texas, to Fort Quitman 81 miles below El Paso. More than 99 per-

"Because the Rio Grande Basin is primarily an arid region, those few perennial streams within the basin have considerable influence upon the lives and livelihood of the region's inhabitants. . ."

cent of the water comes in about equal amounts from Colorado and northern New Mexico. The basin is divided into three sub-areas designated as the San Luis Section in Colorado, the Middle Section in New Mexico, and the Elephant Butte Project Section of Southern New Mexico, including extreme West Texas and the adjacent river valley in the Republic of Mexico.

San Luis Valley The San Luis Valley is a large north-tending structural depression downfaulted in the eastern border and surrounded on the west, north, and east by mountains. It is a high flat mountain valley with an average altitude of about 7,700 feet. Underlying the valley is as much as 30,000 feet of alluvium, volcanic debris, and interbedded volcanic flows and tuffs. Most of the valley floor is bordered by alluvial fans deposited by streams originating in the mountains; the most extensive of these is the Rio Grande fan.

The northern half of the San Luis Valley is internally drained and is referred to as the "closed basin." The rest of the valley is drained by the Rio Grande and its tributaries. A number of small streams enter the closed basin and practically all water produced by these streams that is not consumed in irrigation is lost by evapotranspiration. In addition, all water diverted from the Rio Grande for a large irrigated acreage in the closed basin and not consumed in irrigation is also lost in the low portion of the area by nonbeneficial evapotranspiration. Mineral concentrations in the shallow groundwater in part of the closed basin range to nearly 14,000 mg/1.[2]

Groundwater in the San Luis Valley is from confined aquifers which contain at least 2 billion acre-feet of water in storage.[2] The unconfined aquifer is of modern origin and occurs almost everywhere in the valley. Recharge to the unconfined aquifer is mainly by infiltration of applied irrigation water and leakage from the distribution system. Some water percolates from the many streams flanking the valley and from local precipitation. Subirrigation is widely practiced in the valley and the phreatic surface must be brought very close to the land surface for at least part of the year.

The valley is arid, and a successful agricultural economy would not be possible without irrigation. The main irrigated crops produced are alfalfa, potatoes, barley, oats, hay, and pasture. Irrigation development began in the San Luis Valley after 1850, and the oldest water right in the valley is dated 1852. Rapid and extensive settlement occurred which utilized waters from the Rio Grande after construction started on the Denver and Rio Grande Railroad through the valley in 1879.

The Middle Section The Middle Rio Grande Section is a land of flat dry desert floors, and rocky precipitous mountains in the northcentral part of New Mexico. It includes the Rio Grande and tributary valleys from the Colorado state line to San Marcial at the head of Elephant Butte Reservoir, a river distance of about 270 miles.

The Rio Grande flows into New Mexico from a southerly extension of Colorado's San Luis Valley through a deeply entrenched channel for some 75 miles downstream. At the mouth of this canyon the river enters the several valleys that make up the Middle Section. These basins within the Middle Section are aligned in a generally southerly direction and consist of broad plains flanked by mountains. The basins are partially filled with Quaternary and Tertiary sediments known collectively as the Santa Fe Group. Irrigated lands lie in narrow strips from one to five miles wide on each side of the river within the basins.

Groundwater is primarily from valley fill sediments that have been deposited along tributary streams and have filled much of the Rio Grande trough. These fills are generally stream-connected and are recharged mainly from stream flow. The status of groundwater in the basin is not well known and only generalized physical properties and water bearing characteristics are available.

[2]P. A. Emery, et al., "Hydrology of the San Luis Valley South-Central Colorado," Hydrologic Investigations Atlas HA-381, U. S. Geological Survey, 1971.

Questions and Answers

(The following are questions and answers posed to symposium speakers following the presentation of the position papers.)

Question: "The state of New Mexico has a surplus of something like $41 million, and state leaders apparently want to do something on a non-recurring basis with these funds. What are the chances of this money being put into research which would use the facilities of our institutions of higher learning?"

President Gerald Thomas: "As you know, there are a good many demands on those monies, and higher education is in there asking for some of these funds. I think nearly everything that those funds will be spent for will relate to the quality of life for the people of New Mexico, and they will be one-time expenditures. But they won't necessarily go to the university. Unfortunately, in our budget request to the legislature we do not get very receptive hearings when we ask for support for continuing education, when we talk about service programs. There is now a more or less fixed approach to resident instruction. The three doctorate-offering institutions are on a formula basis in terms of state appropriations for research. But, continuing education and service at the present time are not recognized as a specific funding effort. We have made some requests, the universities have all made some requests, for specific programs in these areas. It's very difficult to get support for them out of the legislature. However, that is a point that could be discussed directly with the Governor and with the Governor's staff as one possible way to make effective use of these funds."

Dr. Lee Zink: "We might just say this council has had no money from the state government. It's been in operation a little over a year, and the work that has been done has been done out of the contributions of a lot of people who have simply worked harder. I feel that one of the things that we may have to do to get to this point is to indicate to people that we as faculty in universities are willing to do this kind of thing. If we were to go now and ask for some of that surplus, although President Thomas said we might do that, I think we would be looked upon somewhat skeptically."

Question: "What is going to happen to the good input received from the faculty during this symposium? What happens now?"

President Gerald Thomas: "This is only one of the programs designed by the Council on Quality of Life. We have already done some things to improve our relationships with the state agencies, and I think Bill Simms (Director, New Mexico Department of Development) will verify this. He was instrumental in calling a recent conference with the state agencies. He has been instrumental in planning many of our service activities, even maybe planted some of the ideas in the Governor's mind in regard to the quality of life program. Some good things will come from this conference, both directly and indirectly. The indirect benefits may even surpass the direct benefits. We've all gained from this experience here today. The seeds have been planted. It's my hope that they will germinate and grow."

Dr. Lee Zink: "I really can't add anything except to say what I've said earlier. This is the first one of these, and it seems to me that because of the responsiveness of all of you it has been tremendously successful relative to our expectations. We're going to try to do this on every college and university campus. We will obviously have different results on different campuses, but if we can get enough people sincerely interested in these problems, we can perhaps help solve some of them. We're a fairly strong political force if we all decide to get together and work on something. We haven't done that yet, and there's no reason why we can't. And, as I said earlier, we are surely the largest intellectual resource in the state."

Question (Ms. Grace Olivarez): "One of the recommendations that has come out of our discussions is

that the university is going to have to start giving a little more dignity and status to service so that faculty feels that it's worth getting involved in service. Unless the university starts rewarding service the same way that it rewards research and educational activities, then, frankly, I will feel that I have wasted my time. President Thomas, what is the process that a university uses to start giving dignity to the service aspect?"

President Gerald Thomas: "I think we have done this successfully through the agricultural extension program. I believe this is the only major program where dignity and organization have come to continuing education or service activities. We need to take the pattern that has been established in extension into the other areas. Of course, ISRAD at UNM is attempting to do this, but it is difficult. Extension, you see, dates way, way back, and it took many, many years to evolve the system that we have there. In terms of budget requests, we have more difficulty justifying the budget for the agricultural extension service than we have for almost any other aspect of the university budget because 'service' is hard to sell. Whenever you get people involved more directly with service to the community, mistakes can be made, and if one person makes a mistake it impacts on the budget request."

Question: "Dr. Momaday, would you respond to the emphasis that's been put on economics in relation to your emphasis on culture and human factors? Is this necessarily first? If so, what would you feel should logically follow?"

Dr. Scott Momaday: "I think maybe the reason we have settled upon the economic issue first is because it is much easier to see and to define. When you begin to talk about human considerations, human factors, in the quality of life, so much in that area really remains to be defined. It's sometimes very difficult to understand what those factors are and how they work in the equation which finally culminates in the quality of life on a general scale. And so I'm not surprised that this is the turn that our discussion has taken. I think we've been very productive in our statements tonight and I've been very pleased to see it. I think there still remains, of course, the consideration of human factors, and we need to know much more about their influence and the way in which they bear upon the general question."

Comments in Discussion

Discussion by symposium participants was far-ranging. The following topics and comments are representative.

On a definition of 'quality of life'

". . . We don't really have an idea of what the quality of life is. What does the term mean? How does it differ from standard of living? We've got to resolve these issues before we really can go forward and do anything about the quality of life. You can't do anything about it unless you know what it is . . ."

". . . There's standard of living, then there's quality of life, and I think standard of living probably has to come first and then with the resources left over you can enjoy what you can put on top of that. . ."

". . . The university system of departmental disciplinary approaches to higher education tends to focus on standard of living rather than quality of life. It is obvious that there must be some 'base line' of standard of living upon which to begin consideration of quality of life, but such a base line is hard to locate . . ."

". . . Quality of life is a very personal concept for each person, and the best thing we can do is to enhance the opportunity for each individual to pursue the quality of life that best fits his personal concept . . . Education is a key factor in doing this . . ."

". . . What is considered a desirable quality of life by one individual may be unacceptable to another person . . ."

On jobs with dignity

". . . We should be concerned about jobs with dignity for the lower income groups in the state . . ."

". . . We each have chosen an occupation that's enjoyable to us. Yet when we try to find jobs for the poor we become somewhat intolerant in that we expect that if we provide a job it should be taken and happily. I think that it's imperative that we try to meet the job to the type of person we're dealing with . . ."

On communication of university efforts

"... The best way that faculty members can enhance the quality of life is to do a good job in teaching the student what he needs in order to improve the quality of his life ..."

"... Our present programs of research and teaching in the university system are implicitly related to concerns for quality of life; yet we can improve our 'service posture' greatly through the impact of our graduates by simply stating these concerns explicitly in our classrooms and in the distributed literature relating to our research projects ..."

"... The function of the university may be to provide a forum to increase awareness of quality in life ..."

"... We could do more in a positive communication about the value of more training, whether it's at the university level or the technological level. The end result might be that we have more jobs for people who live in New Mexico and that we wouldn't have to import people from other places ..."

"... The university needs to communicate to teachers and parents the need to encourage youngsters, even at the elementary age, to expect to develop their skills. We have a state full of undeveloped/unrecognized talents ..."

"... The technology of plant management and manufacturing methods and things of this nature are not being transmitted from the university to industry as they might be. As a very positive suggestion, it seems conceivable that somewhere in this state there could be coordination between a university group and the college of engineering and the state Department of Development in terms of offering assistance in the technical problems of manufacturing and the technical problems associated with attracting industry to the state ..."

"... Local people sometimes view professors with suspicion; therefore, the university faculty needs to find more and better ways to participate in community affairs ..."

"... The university should allocate funds to support faculty research applied to state problems. These funds should not have to come from outside agencies in order to obtain the release time. This really says that NMSU does not have a service function in the state which is funded internally except for segments of agriculture extension ..."

On expansion of the extension program

". . . The total university needs an extension-like program similar to the service in the College of Agriculture and Home Economics . . ."

". . . We have an extension service that exists throughout the entire state that has aided the economic growth of the state through agricultural development in many ways and is now helping in the homemaking area. Why don't we expand that service to all aspects--economic development, education, growth of all types, family relations. . ."

". . . The extension service as now constituted and the technology that all of us here have developed or can develop could be gotten across to the people so that it is usable to enhance the quality of life if we would first determine how technology is disseminated among people and how to get it to people with a greater efficiency. . ."

On communication of university efforts

". . . There are many programs presently being conducted at the university which have not received publicity or which the public may not be aware of that are affecting the quality of life. The people of the state of New Mexico do need to know what NMSU and all universities are contributing to affect their quality of life and how tax money is being used to improve quality of life in many respective areas. . ."

". . . We need to prepare an inventory (past and present) of research projects which relate to service to the state. These reports and/or information should be made available to the public . . ."

". . .We often write papers about problems of the state, and having done so, we consider our jobs done. We could then arrange seminars for the people who could use the information, even in the absence of a full-blown extension service. . ."

". . . Researchers, after publishing a technical research report, should write a brief abstract in layman's terms for the benefit of local decision makers . . ."

On the university's leadership function

". . . The university should assume a leadership role in the state. Specifically, it should allocate its resources in directions which will produce long-term social gain, rather than disperse, and perhaps squandering, its efforts on immediate crises . . ."

". . . The university should foster efforts concerning planned development. Specifically, it should develop teaching, research, and extension efforts in land use planning and in urban planning . . ."

". . . The universities should show direct concern for utilization of resources. Why plant grasses on campus which require excessive watering in an arid climate? Is the winter 'green' worth the added cost to the school and does it represent a good example? . . ."

". . . The university should take an aggressive role rather than a passive role in many of the factors affecting quality of life . . . University leaders should recognize timely subjects and be prepared to move into these areas early to take leadership before pressures arise . . ."

". . . The faculty should consult with governmental agencies, such as those concerned with water, engineering, and highways. The faculty should share in field experiences and seminars with government staffs. Mechanism for communication should be established with municipal agencies. The university should greatly expand its services to small entrepreneurs, thereby contributing to more employment opportunities as employers increase their own managerial skills . . ."

On service

". . . The overall professional prestige of service work by faculty is not as significant as scholarly activities. Furthermore, the methods of economic compensation for service work are marginal. Faculty members do not believe that equitable compensation for service will be forthcoming; consequently, they tend to gravitate to conventional research for which publications are a measure of contribution . . ."

". . . We are being asked to provide a great service function, but there's a lag in the reward system in that rewards are still based primarily upon research and educational activities as opposed to service . . ."

". . . We have no mechanism for following up on multidisciplinary or interdepartmental efforts at service. It seems that no administrator has a commission to follow up on interdisciplinary studies and faculty members who participate in them get very little credit within the reward system of the university. . ."